REMARKS

Claims 1-10 are pending in the present application. Claims 1-10 are rejected. Claim 1 is herein amended. No new matter has been entered.

Claim Rejections - 35 U.S.C. §103

Claims 1-10 remain rejected under 35 U.S.C. §103(a) as being unpatentable over US 6,300,654 to Corvasce et al. in combination with US 6,444,099 to Sasaki et al., and further in view of US 6,964,873 to Matsuura et al., "Preferred Orientation in Ti Film Sputter - Deposited on SiO_2 Glass: The Role of Water Chemisorption on the Substrate" to Ohwaki et al. and US 6,716,749 to Noguchi et al.

The Examiner admits that Corvasce et al. does not disclose keeping substrate temperature higher than room temperature and lower than 300 °C while forming a Ti lower layer of a lower-electrode conductive film on the insulating film. In fact, Corvasce et al. merely teaches that sputtering could be used, albeit ionizing sputtering. The Examiner notes that Sasaki et al. teaches, among other variations to Corvasce et al., ionizing sputtering temperatures of 200 °C or 300 °C.

The Examiner concludes that it would have been obvious to provide the method in Corvasce et al. with the Ti sputtering while keeping substrate temperature higher than room temperature and lower than 300 °C as taught by Sasaki et al. because the ionizing Ti sputtering of Sasaki et al. would provide the method of Corvasce et al. with prevention of a known problem with collimation sputtering.

The Examiner admits that the above cited combination does not teach crystal orientation (claims 4, 6 and 8) or water added during sputtering (claim 10).

With respect to claim 4, the Examiner notes that Ohwaki et al. describes the desirability of forming a (002) oriented layer of titanium.

With respect to claims 6 and 8, the Examiner notes that Applicants indicate in the specification on page 2, line 25 to page 2, line 1, that "In general, a Pt film oriented in the (222) direction, which is the same direction as the (111) direction, is employed as the lower electrode." The Examiner takes this to mean that the (222) direction is the same as the (111) direction, and uses this to show that the (111) direction of the resulting ferroelectric film of claim 8 is taught, since the orientation of the film of the upper layer will epitaxially result from the orientation of the underlying layer.

Further with respect to claim 8, the Examiner notes that Matsuura et al. discloses the importance of crystal orientation on column 7, lines 34-50 and col. 3 lines 38-52, where Matsuura et al. recites that "...it is known that the ferroelectric properties of a PZT or PLZT film is related to the orientation of the PZT of PLZT crystals constituting the film. Commonly, a predominately (111) or (100)-orientation is obtained for a PZT or PLZT film formed on a Pt lower electrode, which has a self-textured (111)-orientation (claim 8), due to the epitaxial effect, in which the surface energy is minimized as a result of the foregoing film orientation."

With respect to claim 9, the Examiner admits that the above combination does not disclose the improvement of the insulating film before further forming the device. The Examiner concludes that it would have been obvious to provide the process of the combination with step of

NH_3 plasma nitridation before the lower layer of the lower-electrode conductive film is formed because Noguchi et al. teaches that the plasma nitridation would improve the surface of the insulating film.

With respect to claim 10, the Examiner notes that Ohwaki et al. teaches that the addition of water during sputtering can improve the resulting orientation of the titanium film in a preferred (002) direction.

With respect to patentably differentiating claim 1, Applicants submit that even if the references were properly combined and the obviousness rejection had merit, the recited temperature range produces unexpected results, as noted in Fig. 2.

Applicants herein amend claim 1 to refine the temperature range recited therein. The claims now recite a temperature of higher than room temperature and lower than ~~300~~ 200 °C. Now, Applicants submit that because the prior art is directed to a broad range, the claims directed to a narrow range, and there is unexpected results associated with the present invention, the presently claimed invention is neither taught nor suggested by the cited combination of references.

Such a temperature range is supported in the specification. Applicants note that Fig. 3 includes approximate temperatures of room temperature, 100 °C, 125 °C, 150 °C, 175 °C and about 200 °C. Therefore, Applicants depend on Fig. 3 to support amending claim 1 to recite a maximum temperature of higher than room temperature and lower than 200 °C.

Sasaki teaches that its heater controls the temperature of the substrate 50 over a range from room temperature to about 500 °C. However, even if this were a suggestion to use any

temperature in the range, Applicants submit that the present specification includes unexpectedly superior results in the range of room temperature to 200 °C.

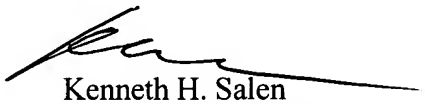
In view of the aforementioned amendments and accompanying remarks, Applicants submit that that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP



Kenneth H. Salen
Attorney for Applicants
Registration No. 43,077
Telephone: (202) 822-1100
Facsimile: (202) 822-1111

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